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BEAUFORT SEA HYDROCARBON EXPLORATION—

A Federal Perspective

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**BEAUFORT SEA
HYDROCARBON
EXPLORATION—
A Federal Perspective**

Northern Affairs Program

**Northern Resources and Economic
Planning Branch**

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PREFACE

The following report should be viewed as a working document which provides a brief overview of hydrocarbon exploration undertaken in the Beaufort region, describes the environmental and socio-economic milieu, and cites federal accomplishments in introducing and administering environmental legislation and monitoring oil and gas activities. In addition, it sets forth some broad objectives and guidelines intended to facilitate hydrocarbon exploration, and to ensure that it can proceed in a socially and environmentally responsible manner.

It should be noted that the guidelines are not intended to be binding; they simply suggest good practices that should be followed by anyone exploring for oil and natural gas in the Beaufort region and other parts of northern Canada. They are, in large measure, based on current industrial practices.

The petroleum industry has gone to considerable effort and expense to ensure that its activities are not disruptive to northerners. By voluntarily complying with the guidelines proposed here, companies active in the Beaufort will help to ensure that the unique heritage of the Beaufort Sea can be properly safeguarded. DIAND also hopes these guidelines will serve to alert Canadians to the tremendous challenges and opportunities which northern oil and gas exploration poses.

PART 1

INTRODUCTION

The people of the North have survived a harsh environment for many centuries. In recent decades native northerners have been offered new opportunities to move beyond survival and to define their relationship to other Canadians. They are now in a position to make their own choices about the place they wish to occupy and the part they wish to play in the evolving society of Canada, north and south of the 60th parallel.

Interest and concern in the North, stimulated by dramatic discoveries and technological achievements, have made northern development a national endeavour. Canadians have been optimistic about the evolution of national purpose in the North, but they have also been deeply concerned that the development of major resources should not violate important social and environmental values.

Environmental legislation has been put in place during the past two decades in response to seismic and exploratory drilling programs conducted in many parts of the Arctic. Government also took other initiatives with respect to oil and gas exploration, for example, the equity interest in Panarctic Oils.

The discovery of oil at Prudhoe Bay, Alaska in 1968 proved a major catalyst to oil and gas activity in the Canadian Arctic. Since that discovery, a number of large hydrocarbon development and transportation projects have been proposed, notably, the Mackenzie Valley Gas Pipeline, the Alaska Highway Gas Pipeline, the Dempster Lateral, several variants of the Polar Gas Pipeline, and the Arctic Pilot Project.

Government has addressed concerns about such projects with major commissions of inquiry, such as the Berger and Lysyk Commissions. It has also strengthened its internal capacity for environmental and socio-economic assessment by establishing the Environmental Assessment and Review Process (EARP), under the Minister of Environment. It has recently taken further steps to strengthen its position with respect to the exploitation of northern oil and gas resources by creating the Canada Oil and Gas Lands Administration (COGLA) and the Northern Oil and Gas Action Program (NOGAP). In cooperation with industry, it will use the Environmental Studies Revolving Fund (ESRF), created by the Canada Oil and Gas Lands Act, to close knowledge gaps. The federal government, through the Petroleum Incentive Programs (PIPs) established under the National Energy Program and exploration agreements negotiated by COGLA, has an important bearing on the feasibility and rate of exploration in frontier areas such as the Arctic.

Since Prudhoe Bay, the oil and gas industry, with the encouragement and support of the federal government, has greatly increased its activities in the Arctic. It has moved from relatively routine onshore drilling to much more demanding and costly drilling offshore. It has become more sophisticated about the northern environment and has established good working relations with northern communities. It has been an important source of wage employment for northerners who live in communities near exploration activity.

Much has been accomplished by both the public and private sector, with government providing the legislative and institutional framework for activity, and industry providing most of the productive resources. However, gaps still exist in both the environmental and socio-economic fields -- gaps which, given the increasingly complex environment of the 1980's, can only grow if they are not identified and addressed now.

The guidelines proposed in this publication address the environmental and socio-economic effects of exploratory drilling in the Beaufort Sea region. Although they could establish important groundrules for development and ultimate production, they do not specifically relate to these phases of activity, which are the mandate of the Beaufort Sea EARP Panel. While some of the guidelines are based on measures which have been applied to Beaufort operators or which the operators have themselves applied for several years, others represent new requirements. They are being made public at this time to encourage an awareness of the concerns of government about matters relating to exploration and the steps being taken to address these concerns.

The issues that have been raised will require re-evaluation as activity proceeds and government policies evolve. Among initiatives now under development or revision are a northern hydrocarbon development strategy, a land use planning system, the Economic Development Agreements (EDA's) between the Government of Canada and the territorial governments, a northern economic development strategy, the negotiation of claims with northern native groups, and federal/territorial constitutional discussions.

Some of these initiatives, for example, the Economic Development Agreements, could make more government resources available to areas like the Beaufort Sea region, and should provide a sounder basis for responding to opportunities and impacts resulting from Beaufort oil and gas activity.

The Beaufort Sea region, which is the focus of this publication, extends from Demarcation Point on the Canada-Alaska boundary in the west to the Coronation Gulf area

Figure 1

BEAUFORT SEA REGION

km 80 0 80 160 km
SCALE

140° 135° 130° 125° 120° 115° 110°

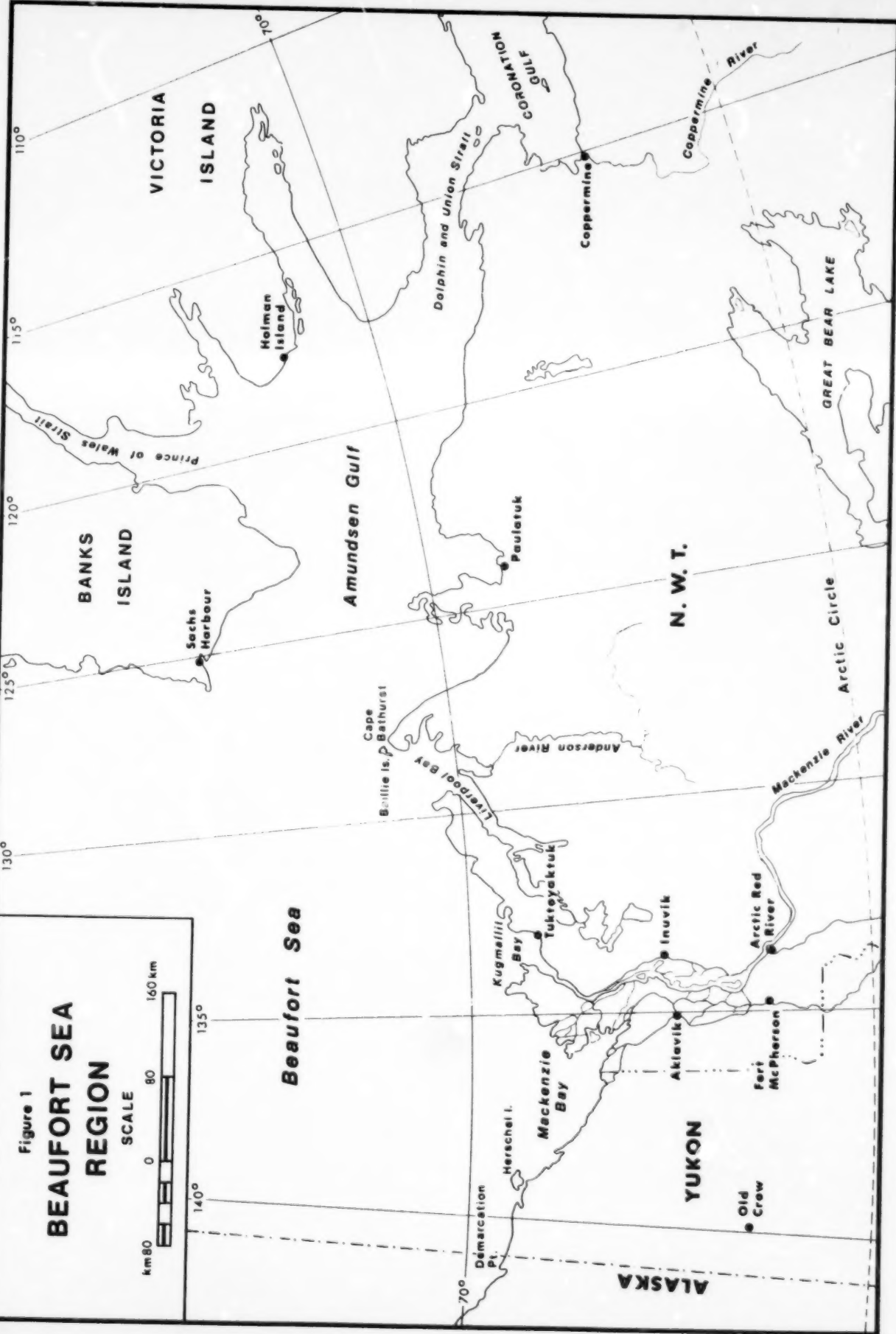
Beaufort Sea

Amundsen Gulf

N. W. T.

YUKON

ALASKA



in the east. It includes the Beaufort Sea (including Mackenzie Bay, Kugmallit Bay, and Liverpool Bay), Amundsen Gulf, Dolphin and Union Strait, Coronation Gulf and Prince of Wales Strait, and lands such as northern Yukon and Herschel Island, the Mackenzie Delta, the coastal lands extending from the Delta eastward to the Coronation Gulf area, Banks Island, and the western part of Victoria Island. The region and its communities are shown in Figure 1.

PART 2

LEGISLATIVE AND POLICY BACKGROUND

The Department of Indian Affairs and Northern Development (DIAND), under the Territorial Lands Act, Public Lands Grant Act, Northern Inland Waters Act and Arctic Waters Pollution Prevention Act, retains regulatory responsibilities for the administration and management of all lands and waters north of the 60th parallel. As such, DIAND is the federal department which has the authority to issue licenses, permits and leases for all development or use of northern lands and waters. In discharging this mandate, DIAND has the further responsibility of evaluating and coordinating government preparedness for northern hydrocarbon development.

Initiatives which the government and the private sector are taking in the Beaufort have a solid foundation in legislation and government action, a foundation which DIAND and other federal departments and agencies have developed during more than two decades of experience with northern oil and gas activity.

The Canada Oil and Gas Production and Conservation Act came into force in 1969. Major amendments were made in 1970 and again by the Canada Oil and Gas Act, which came into force in March, 1982. These amendments related to environmental protection, contingency plans, oil spills and related activities.

Section 12 of the Oil and Gas Production and Conservation Act authorizes the Governor-in-Council to make regulations with respect to the exploration, drilling, production, conservation and transportation of oil and gas.

COGLA, which was created by the Canada Oil and Gas Act, has the responsibility for administering oil and gas activity on Canada lands on behalf of the Ministers of Energy, Mines and Resources (EMR) and Indian Affairs and Northern Development.

COGLA provides support to DIAND's northern policy and to EMR's energy policy. It reports to the Ministers of both departments. Each of the Ministers has retained within their department some specialized functions, while pooling their oil and gas administration.

Retained in DIAND are the management and protection of the natural resources of northern Canada and the Arctic offshore, regional and socio-economic elements (employment and training and business opportunities for northerners and related

aspects), federal/territorial relations, and coordination of northern policy dealing with hydrocarbon exploration, development, production, consumption in the North and transportation.

As more companies renegotiate existing oil and gas rights under the new Canada Oil and Gas Act, DIAND will be consolidating and extending its northern social and economic benefits program. As a recent initiative, regionally based Northern Benefits Committees (NBC's) have been created to deal, in a comprehensive manner, with regional concerns related to oil and gas exploration activity North of 60°. Concerns to be addressed include the implementation at the operational level of industry policies and programs in areas such as consultation, recruitment, training and business opportunities. The committees will also perform monitoring duties allowing comprehensive assessment. They will bring together regional expertise to develop a regional position with respect to northern benefits issues related to the Canada Benefits packages negotiated by COGLA as part of the Exploration Agreements. The NBC's will also provide a local point of contact for the oil and gas industry, native organizations, northern businesses and residents on matters concerning the Northern Benefits Section of the Canada Benefits packages.

Cabinet has also endorsed DIAND's proposals for a northern hydrocarbon development strategy and reaffirmed DIAND's lead role among federal departments and agencies with respect to northern oil and gas exploration and development. The northern hydrocarbon development strategy focusses on research, planning and monitoring activities to prepare for eventual development and production of oil and gas from the Beaufort Sea/Mackenzie Delta area.

In cooperation with the territorial governments and other federal agencies, DIAND has encouraged oil and gas exploration companies to maximize employment and business opportunities available to northern people. The Department has monitored annual exploration programs to determine the extent to which northerners benefited from these programs and to ensure that valued aspects of northern lifestyles were not being undermined.

DIAND and the territorial governments share a role in socio-economic responsibilities that relate to northern hydrocarbon developments. The territorial governments have jurisdiction over health, welfare, education and wildlife, while the Minister of DIAND has overall responsibility for special measures to protect northern interests, for the impacts of hydrocarbon projects, and for ensuring consistency between federal and territorial programs and policies.

More than a decade ago the Government of Canada affirmed that the needs of the people in the North are more important than resource development and that the maintenance of ecological balance is essential. In 1972, the Minister of DIAND announced that the federal government's northern policy for the 1970's was one of balanced development. In its essentials, this policy has not changed. Among other things, the national objectives for northern development clearly state that the government wants to provide for a higher standard of living, quality of life and equality of opportunity for northern residents by methods which are compatible with their own preference and aspirations. It wants to maintain and enhance the northern environment with due consideration to economic and social development, and to encourage viable economic development in regions of the northern territories so as to realize their potential contribution to the national economy and the material well-being of all Canadians. The government also wishes to realize the potential contribution of the northern territories to the social and cultural development of Canada.

In fulfilling his responsibilities under the Canada Oil and Gas Act, the Minister of DIAND is responsible for ensuring that the rate and manner of oil and gas activity does not jeopardize the North's environmental, social and cultural integrity. He is also responsible for ensuring that all forms of development and land use, including the setting aside of special conservation areas, achieve a balance between resource development and conservation.

With the advent of a comprehensive regime to govern the exploration, development and production of hydrocarbons, as described in the Canada Oil and Gas Act, and complemented by the Oil and Gas Production Conservation Act, the means to achieve the overall objective of balanced northern development now exist, and are, moreover, supported by comprehensive legislation. The guidelines proposed in this paper follow directly from what is already in place and are intended to ensure that the intentions of government policy are fully realized.

PART 3

OIL AND GAS ACTIVITY - PAST, PRESENT AND FUTURE

During the early years of drilling in the Mackenzie Delta, industry had little trouble meeting the requirements of its exploration permits. By deploying conventional rigs at land-based locations, ten wells per year were drilled between 1970 and 1977. However, interest in onshore areas has waned in recent years and land-based activity has declined to the drilling of one well per year.

Since 1972, twenty-two wells have been drilled from artificial islands in water depths ranging up to twenty-one metres (Esso Resources, Suncor), mostly during the mid-1970's. Since 1977, the number of island platforms completed and wells drilled have declined to one each per year, partly because of lack of near-shore drillable prospects accessible by trucks hauling land fill over the sea ice. Greater distances to sites further offshore and the increased volume of fill required in deeper waters necessitated the use of dredges using material from the seabed. Although the number of dredges in use in the Beaufort region has grown from the initial single dredge to the current five, because of the difficult construction environment only three islands and two sub-sea berms have been built since 1979.

Ship-based drilling activity commenced in deeper waters in 1976 with an initial fleet of three drillships. Increases in the drilling fleet (another drillship and icebreaker support were added in 1979) and a gradual lengthening of the drilling season (from 60 days to 100 days) raised the number of wells drilled from an average of two to three per year. Since 1976, twenty-two wells have been started from drillships in water in excess of twenty-one metres, with Dome Petroleum, Hunt International and Gulf Canada being the principal operators.

Drilling technology is now moving towards the use of platforms capable of operating year-round at greater depths and in more severe ice conditions. At the Tarsiut site, Dome introduced its concrete caisson-retained artificial island in 1981 and its single steel caisson in 1982. Gulf plans to have its conical drilling unit and icebreaker support on station in 1983, and its mobile arctic caisson in the Beaufort Sea in 1984. Esso added another dredge and will deploy its steel caisson in 1983.

Some of the more significant aspects of onshore and offshore oil and gas activity in the Beaufort Sea region during the past decade are presented in Figures 2 to 10. Of particular significance is the sharp drop, since the mid-1970's, in the number of wells, metres drilled and expenditures onshore

BEAUFORT / DELTA

Wells drilled by year
1970 to 1982

Fig. 2
ONSHORE

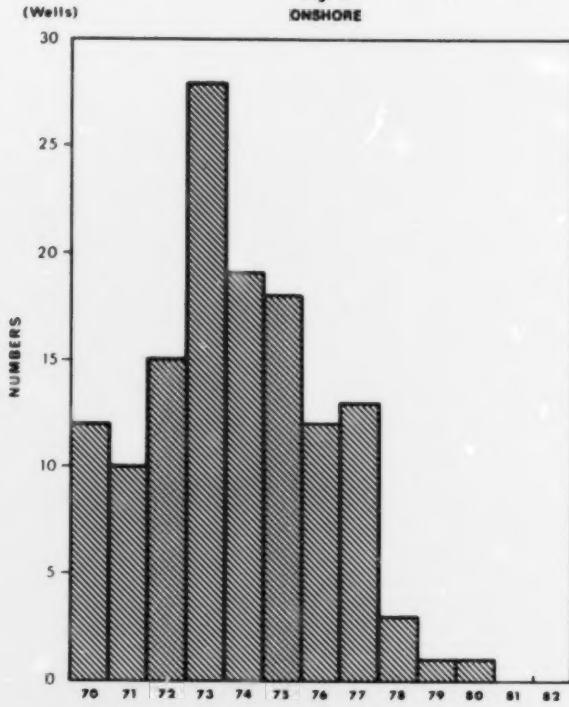
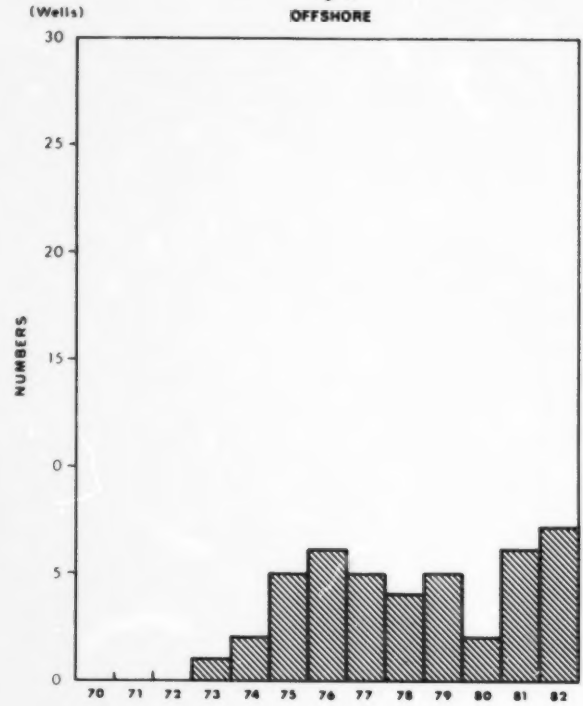


Fig. 3
OFFSHORE



BEAUFORT / DELTA

Metres drilled by year
1970 to 1982

Fig. 4
ONSHORE

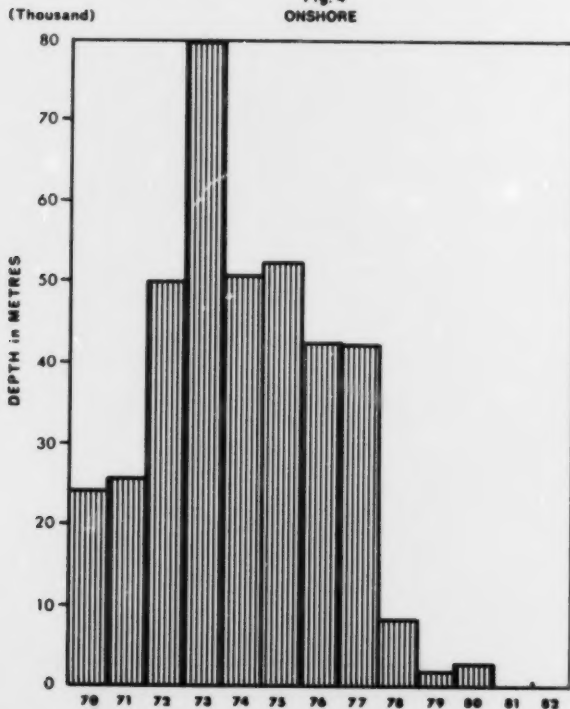
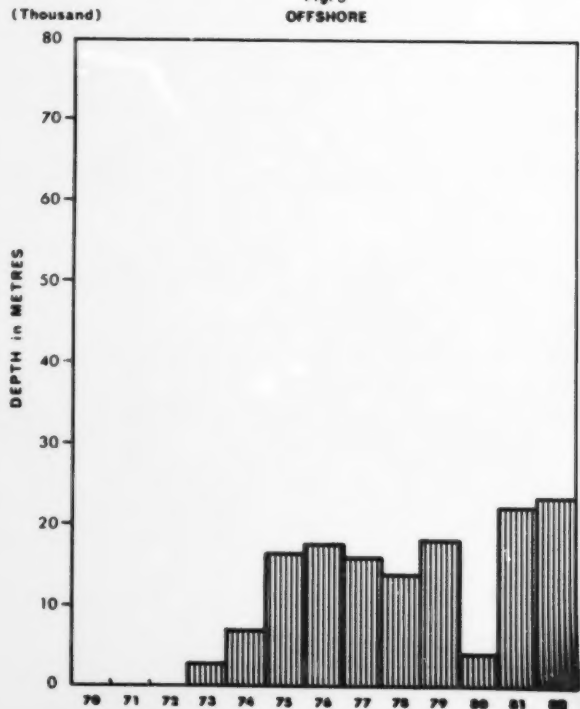
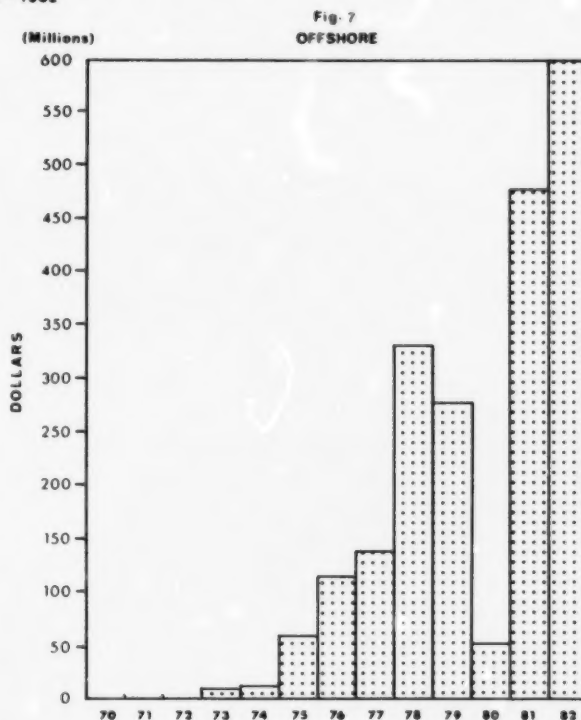
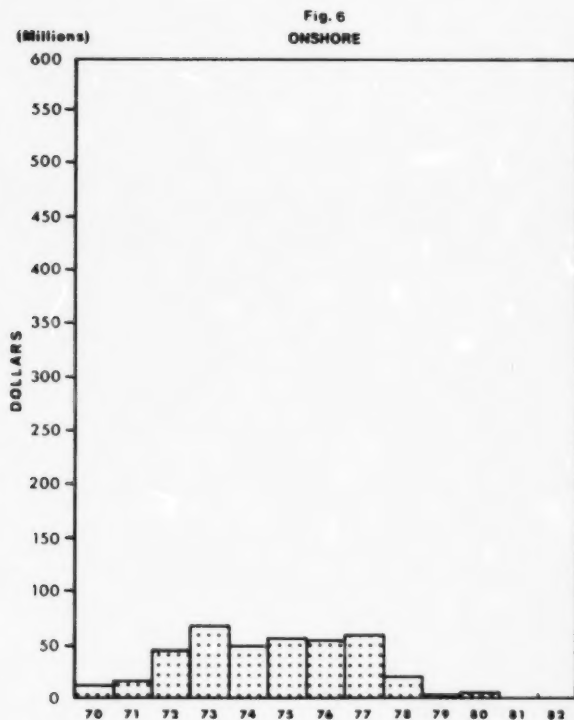


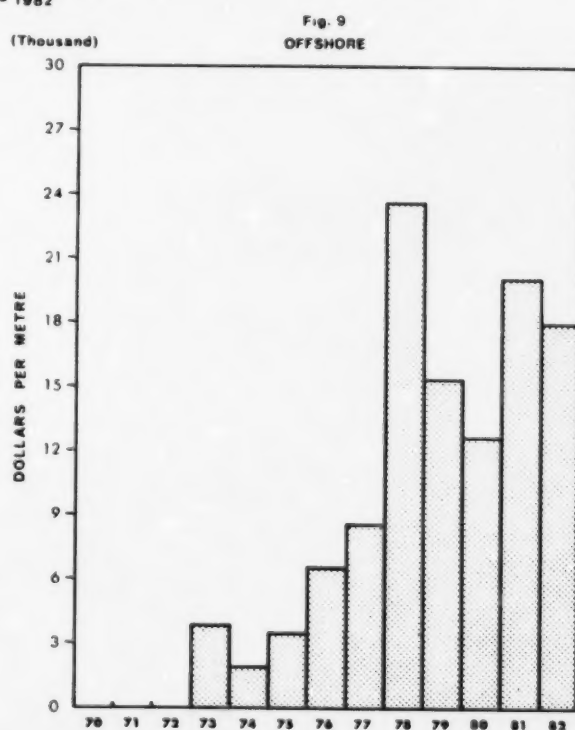
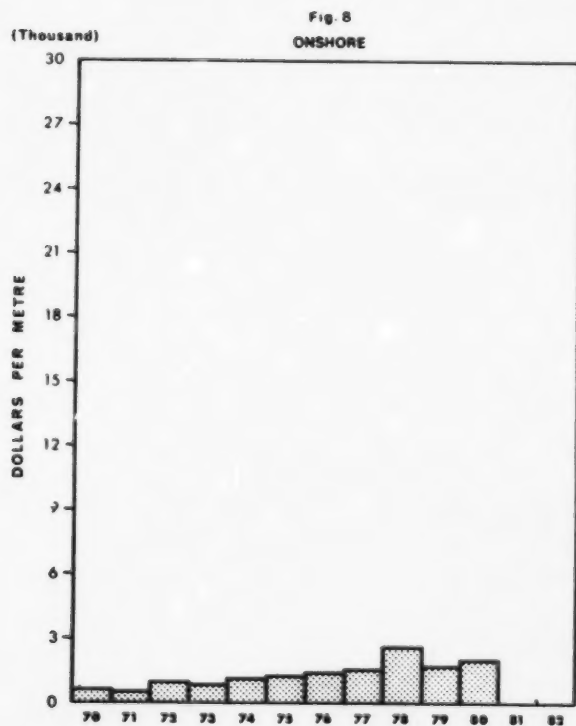
Fig. 5
OFFSHORE



BEAUFORT/DELTA
Total drilling expenditures by year.
1970 - 1982

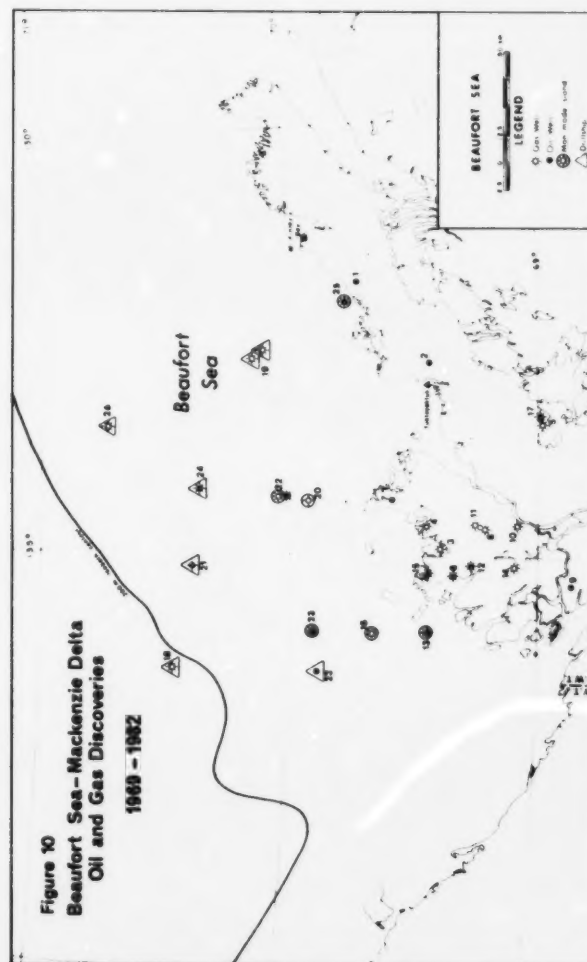


BEAUFORT/DELTA
Mean cost per metre drilled by year.
1970 - 1982



LEGEND TO FIGURE 10

	1960	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
1. IOE ATKINSON														
2. IOE MAVOGIAN														
3. ESSO TAGU														
4. IMP MALLU														
5. GULF MOBIL PARSONS														
6. SHELL NGILITGAK														
7. IMP IVIK														
8. GULF MOBIL YAYA 5														
9. SHELL KUGPIK														
10. GULF IMP REINDER														
11. GULF MOBIL YAYA N														
12. SHELL KUMAK														
13. ESSO ADEO														
14. GULF TITALIK														
15. SUN GARRY														
16. ESSO NETSERR														
17. GULF MOBIL KAMIK														
18. DOME HUNT NERTORALIK														
19. DOME HUNT UKALERN														
20. ESSO ISSERN														
21. DOME KOPANOM														
22. ESSO ISSUNGNAR														
23. DOME TARSUUT														
24. DOME KOKAKAK														
25. ESSO WATKINSON														
26. DOME KENALOOK														



(Figures 2, 4 and 6) and the corresponding rise in these variables offshore (Figures 3, 5 and 7). While expenditures offshore have greatly exceeded expenditures onshore during recent years, there has been a less than proportionate increase in the number of offshore wells and metres drilled, mainly because drilling offshore is technologically more difficult and costly.

PART 4

THE ENVIRONMENT

Background

The Beaufort Sea is almost totally covered by ice from October until July, during which time three ice zones can be distinguished. A seasonal landfast ice zone extends from the coast to waters of about 20 metres in depth. Further offshore, the permanent polar ice zone composed of multi-year ice circulates throughout the year in a clockwise direction in the Beaufort Gyre. Between these two zones lies a transitional zone of largely seasonal ice, but incorporating some multi-year floes and pressure ridges. First year ridges are also common. This transitional zone is highly dynamic, but in general the ice moves from east to west. Shear forces at the landfast ice boundary give rise to the frequent occurrence of floe leads. Many of the sites presently being (or planned to be) explored lie within the transitional ice zone.

The major surface water currents are the far offshore westward or clockwise movements associated with the Beaufort Gyre and the general eastward coastal drift of the Mackenzie River discharge. However, superimposed on the latter is the influence of wind. Easterly winds generate a northward flow, while westerlies result in a shoreward and eastward drift. The Beaufort tends to be a calmer sea than most of the world's major water bodies because ice restricts the build-up of waves. The highest waves occur in September as a result of westerly and northwesterly winds blowing over large expanses of ice-free water.

The biological environment reflects the restrictions imposed by severe climate and sea ice. Overall annual productivity is therefore not high, but an extensive biological community is supported during the brief summer months. The most visible components include:

- a summer population of approximately 2,500 bowhead whales estimated to represent 75% of the world population of the species;
- a summer population of approximately 7,000 beluga whales which concentrate in the Mackenzie estuary where calving is believed to occur;
- a fluctuating population of ringed seals estimated to vary in the Beaufort region from between 23,000 and 62,000 in number (this species occupies a central position in the Arctic marine food chain);

- caribou herds which migrate to the coast to calve during early summer;
- several other important mammal species including the bearded seal, polar bear, arctic fox, grizzly bear and wolf; and,
- a diverse summer population of marine and coastal birds, all of which undergo a moult and are therefore flightless for two to three weeks during their stay in the Beaufort Sea region.

Environmental Objectives

DIAND's objectives, with respect to the environment of the Beaufort Sea region, are:

- (i) the protection of flora and fauna, with particular emphasis on the renewable resources harvested by northerners;
- (ii) the preservation of ecologically important sites and areas;
- (iii) the containment of disturbances within geographic areas, as few and as small as possible, with due consideration to the sensitivity of the environment;
- (iv) the early identification and monitoring of impacts, and the management of development activity to maintain overall environment quality; and,
- (v) conditions attached to development which clearly respect environmental values.

DIAND administers a body of legislation designed to promote the realization of these objectives and to permit development to go forward with limited negative effects on the environment.

Issues and Initiatives

DIAND has addressed major environmental issues concerning Beaufort activity as follows:

- (i) Increased vessel use at biologically critical times:
An increase in the use of icebreakers and supply vessels, as wells are drilled further offshore and the operating season is extended, could lead to more frequent interference with seals during late winter and spring, and with beluga and bowhead whales during spring, summer and fall.

- (ii) Increased underwater noise: There is concern about noise created by icebreakers and carried under the ice. Little is known about the effects of such noise on the communicating ability of marine animals. The department is overseeing a study which will address these effects.
- (iii) Increased aircraft support at biologically critical times: Government regulations are in place to constrain aircraft from flying over habitat used by birds and terrestrial animals during critical periods such as moulting, nesting, calving and migration.
- (iv) Additional shorebase support: Tuktoyaktuk and McKinley Bay are currently the main shorebase sites for Beaufort exploration. Activities at these locations are carefully monitored. There is an application before DIAND for another major site at Stokes Point in the Yukon. Issues surrounding this site are complex and a decision is pending. All further applications for shorebase sites will be carefully assessed by the federal government to determine their compatibility with environmental, conservational and social objectives.
- (v) More winter and year-round access roads: Applications for roads are assessed by land use experts, and conditions for operations are specified in land use permits. This lessens the likelihood of roads cutting across important animal habitat or migration routes.
- (vi) Operational feasibility of oil spill contingency plans: In dealing with environmental concerns related to oilspill contingencies, the department is actively involved in the Arctic Marine Oilspill Program (AMOP), and, through COGLA, oversees technical and engineering concerns related to northern exploration activities.
- (vii) Produced water discharge: Formation waters produced during the testing, drilling and production stages have frequently been identified in other offshore areas as having the potential for significant environmental impact. It is only after chemically testing the fluids that permission is given to discharge them into the sea.
- (viii) Chronic pollution: Because deterioration of air and water quality may occur in the North, particularly in harbours, conditions are imposed to ensure that operators discharge wastes in a responsible manner.

- (ix) Increased dredging of the sea floor: This could become a major concern if greatly increased quantities of dredged material are required for deep water facilities. Regulations are now in the discussion stage on the matter.

Monitoring

The purposes of environmental monitoring are the early identification of environmental problems, the continued protection of natural resources and the environment, the collection of data for impact assessment purposes, and the evaluation and modification of mitigative procedures. Officers responsible for the protection of the northern environment are concerned that the gap between industry and government expertise should be closed, a matter which research proposed under the northern hydrocarbon development strategy is designed to address.

One of the more important elements of the strategy is the Northern Oil and Gas Action Program (NOGAP). NOGAP is but one of a number of government programs that relate to hydrocarbons in the north. The Panel on Energy Research and Development (PERD) has a broad energy interest which includes oil and gas, but its primary focus is with models, methods, and techniques that may eventually lead to increasing Canada's energy supplies. The Northern Environmental Studies Revolving Fund (NESRF) focusses on environmental and socio-economic aspects of northern oil and gas developments that are relevant to both the petroleum industry and governments, but excludes topics that are strictly government's responsibility. NOGAP is intended to cover those areas which are solely needed by governments in fulfilling their regulatory and planning responsibilities.

PART 5

SOCIO-ECONOMIC MILIEU

Background

Ten communities can be viewed as comprising the Beaufort Sea region. These are Old Crow in the northern Yukon, and Aklavik, Fort McPherson, Arctic Red River, Inuvik, Tuktoyaktuk, Paulatuk, Coppermine, Holman Island and Sachs Harbour in the Northwest Territories. The combined population of these communities is about 7,000, or 10% of the total population of the northern territories. Population under age 20 varies from 50% to 65% in these communities. All of the communities remain linked to the northern native traditional pursuits of hunting, fishing and trapping.

Inuvik, with a population of about 3,000, is the largest of the communities and is the most "southern" of the Beaufort communities in character and appearance. It holds a special position within the Beaufort Sea region. Inuvik's business and government services, river wharfage and airport are in many cases vital to the functioning of the region as a whole. By northern standards it has a relatively diversified local economy, but dependence on external resources, especially those of government and the oil and gas industry, is strong. The population, which is 75% non-native, is generally supportive of industrial development.

Aklavik and Fort McPherson have populations of 700 and 800, respectively. Tuktoyaktuk, also with a population of about 800, has undergone considerable change because of the presence of the oil and gas industry during recent years. It occupies an increasingly unique position in that its business and wage sectors have grown simultaneously with locally based oil and gas activity. Because of its moderate draft harbour, Tuktoyaktuk is an important transportation and transshipment centre, and the principal northern operations base of Dome, Esso, Gulf, Northern Transportation Company Ltd., and other companies.

Communities such as Arctic Red River, Old Crow, Paulatuk, and Holman Island, each with a small population ranging from 100 to about 300, pursue a hunting, fishing and trapping lifestyle, but have some dependence on wage employment. Although it lies far to the east of the Beaufort Sea, Coppermine, with a population of about 900, is often included in the Beaufort Sea region because its labour force has had considerable experience in working on oil and gas exploration in the Mackenzie Delta.

Apart from Inuvik, the inhabitants of the Old Crow and the Delta communities are primarily Dene and Métis. Along the Arctic coast, Victoria Island and Banks Island, the population consists mainly of Inuvialuit and Inuit.

With the exception of Inuvik and Tuktoyaktuk, the economic linkages between these communities and the oil and gas sector, while important, are nonetheless limited. These linkages can be understood by focussing on two main aspects of the local economy, namely the need for monetary income and the problem of underemployment.

Monetary Income: Native people have come to recognize that monetary income can provide them with the means of acquiring capital goods such as skidoos, boats, rifles and vehicles which are important to the traditional economy, as well as consumer goods such as television sets, video-tape recorders and refrigerators. Monetary income is now also important to the purchase of food and clothing, although a considerable proportion of the Beaufort region's protein needs is still fulfilled by hunting and fishing. During recent years, a prime source of monetary income has been employment and business transactions with the oil and gas industry.

Underemployed Labour: Changing lifestyles, new subsistence harvesting technology, together with the depletion of game resources in local areas, have combined to bring about a situation in which access to traditional resources has become more restricted. Serious hunters have become more productive, and less effort is now typically required to meet much of a small community's basic protein need. As a consequence, a larger proportion of the Beaufort communities' native labour force has become underemployed, or surplus, in terms of the requirements of the traditional economy. The oil and gas industry has played an important role in the absorption of this surplus labour.

Given the region's dualistic, traditional and modern character, effective functioning of the Beaufort regional economy now depends on several conditions. For example, there needs to be one or more major sources of income and employment in the region; the oil and gas industry has, for more than a decade, been such a source.

In considerable measure because of oil and gas industry spending, the local business sector has expanded and become more diverse, especially in Inuvik and Tuktoyaktuk. To avoid a severe contraction of the local economy (more specifically, the commercial/industrial sector of the local economy), continued significant levels of expenditure by the oil and gas industry would seem necessary.

Many residents are dependent on hunting, fishing and trapping activities as a source of livelihood, and others engage in these activities because of their cultural significance. It is now a usual practice of industrial employers to accommodate work patterns that allow native people to harvest traditional resources.

Since it is unlikely that the traditional economy could ever again support more than a proportion of the region's native people, activities like oil and gas exploitation must continue to provide career opportunities for native people wanting to pursue careers with industry. Northerners whose main economic interest is not traditional harvesting should be encouraged to undertake vocational training. While the industry should provide seasonal and casual work to qualified northerners, it should be sensitive to the needs of serious hunters and trappers who seek wage work because of the need to maintain harvesting capital.

Socio-economic Objectives:

The overall federal objective, with respect to the social and economic aspects of the Beaufort region, is the promotion of stable development within a framework of northern participation and program delivery coordinated by DIAND with the territorial governments and other federal departments. Specific objectives include:

- (i) support of the lifestyle and culture valued by residents of the region;
- (ii) the reduction of regional unemployment and underemployment;
- (iii) the growth and diversification of the regional business sector;
- (iv) the provision of career opportunities to residents;
- (v) the enhancement of education and skills, including management skills, with particular emphasis on skills that are transferable;
- (vi) the provision of a basis for greater regional self-sufficiency; and,
- (vii) the mitigation of the negative social and economic aspects of change.

In light of the responsibilities that have been delegated to the territorial governments, DIAND works closely with them to achieve these objectives.

Issues and Initiatives

- (i) Level and type of wage employment: Wage employment should absorb surplus local labour, provide career opportunities, and impart technical skills. Employment with the oil and gas industry has already had a large effect in this regard.
- (ii) Quality and adequacy of human resource development: Because of low educational attainment and insufficient experience, many residents are not able to take advantage of employment opportunities offered by the oil and gas industry. However, the Human Resource Development Subsidiary Agreement under the Canada - Northwest Territories Economic Development Agreement has been designed to increase labour force participation among regional residents by giving them the basic skills, experience and knowledge required for entry level positions in the wage economy, and to provide access to management training. Programming under this agreement is designed to enable residents to take advantage of employment and business opportunities resulting from economic development activity in general, and major non-renewable resource projects in particular. While the focus of this programming is new, it relates closely to on-going programs funded cooperatively by the federal government and the Government of the Northwest Territories (GNWT).
- (iii) Support of the local business sector: Such support already involves the purchase by oil and gas exploration companies of goods and services from local firms, and provides a basis for the expansion and diversification of the regional business sector. Dealings by oil and gas companies with local business should enhance, and have already enhanced, the development of management skills, and should reduce the dependence of the regional economy on government subsidies. It should encourage the growth of native and community-based development corporations, leading, among other things, to an increasing commercial utilization of regional products such as reindeer, char and arts and crafts. Business experience and expertise are limited among residents of the Beaufort, but programs to raise competence levels are available

from the GNWT. The Canada - NWT EDA also addresses the need for special business development efforts.

Government is focussing considerable attention on the Beaufort business community, and the northern business community in general. For example, also under the Canada - GNWT EDA, a Domestic Market Development Subsidiary Agreement has been designed to capture business development opportunities which could be lost due to lack of capital, to provide the assistance required to establish community-based economic development, to capitalize on the tourism potential of the NWT, and to promote intersettlement trade in country food and quarried soapstone material.

- (iv) Social problems: Many have argued that there are links between accelerated hydrocarbon activity and deteriorating community well-being - that the faster pace of life and higher incomes associated with exploration activity have led to more alcoholism, family breakdown, child neglect, delinquency, and irregular school attendance. Residents of communities affected by oil and gas activity are acutely aware of the problems that have occurred in their communities. With GNWT support, and often on their own initiative, they have developed methods for coping with disturbing trends. However, the seriousness of the problem should not be minimized; clearing it up will require a major effort on the part of all who are involved. Researchers working for communities could draw on sources like the Environmental Studies Resolving Fund (ESRF) to help define issues and propose means for their solution.
- (v) The future of native people: It is recognized that northern people must determine their own future through the settlement and implementation of their land claims. Important strides have already been made with respect to claims in the Beaufort Region. The Committee for Original Peoples' Entitlement (COPE) agreement in principle of 1978 covers most of the region. Once ratified, the COPE agreement in principle would give priority to Inuvialuit in the harvest of renewable resources, would guarantee harvest levels, and would establish consultative research and management institutions. Dene Nation and Council for Yukon Indians (CYI) have also staked claims to lands in the region. COPE and the CYI have overlapping claims to the Yukon north slope.

The Inuvialuit Development Corporation (IDC), based in Inuvik, is the economic development arm of COPE. DIAND funded the corporation with \$10 million as an advance on land claims compensation when COPE signed of the claims agreement in principle. IDC is involved in small regional businesses and may play a significant role in making Beaufort hydrocarbons available to western arctic markets.

Monitoring

Socio-economic monitoring should enable the early identification of problems which, if permitted to run their course, could frustrate regional objectives and the well-being of regional residents. Such monitoring would also provide data for planning. It would provide critical information for testing the effectiveness of company measures, and the adequacy of government social and economic programs.

Although companies have been required to report annually on training, business and other social variables, much of the socio-economic monitoring that has been conducted in the Beaufort region to date has proceeded informally. Indeed, this is often the most useful type of monitoring. Community councils and native organizations have brought issues to the attention of government, and territorial government officials have perceived and dealt with problems in the normal course of their work.

Industry has sponsored bodies such as the Beaufort Sea Community Advisory Committee. Industry and government have participated in community planning meetings. All such measures, while effective, have proceeded on an ad hoc basis and may at times have overlooked significant problems resulting, for example, from cumulative impacts. A more continuous system, with a data base accessible to all interested groups, would be a positive factor, and is being explored by DIAND.

PART 6

GUIDELINES

The following guidelines should apply to exploration and related hydrocarbon activities in the Beaufort Sea region. Though most operators have already put strategies into practice that correspond, in general, with the guidelines, it is felt that an explicit statement made to the general public at this time would lead to a better understanding of the federal government's social and environmental expectations around northern hydrocarbon activities.

The guidelines are intended to help create the conditions that would permit the Beaufort Sea region to move from exploration to development and production with as little friction as possible.

The Environment

- (i) Operators should provide sufficient information to enable a thorough assessment of their activities to be undertaken: Under existing procedures for the approval of exploration drilling programs, DIAND's Northern Affairs Program (NAP), is responsible for assessing the environmental impact of industry proposals, with Canada Oil and Gas Lands Administration (COGLA) issuing appropriate authorities to proceed after NAP has given its approval. To enable DIAND to fulfill its role, companies should provide enough information on their present and proposed facilities and operations, as well as on the environment, to permit an assessment to be made, and they should do so with sufficient lead-time to allow a thorough evaluation to be undertaken. This should present few problems in the case of wells drilled on lands that are onshore, nearshore, or even a moderate distance from shore (e.g., Tarsiut), since experience with such lands is now quite extensive.
- (ii) Operators should continue to apply the principle of progressive technological development: Operators recognize that they are on a learning curve with respect to the arctic environment of the Beaufort, and the technology that is required to operate safely in that environment. The principle of progressive technological development implies that each stage in the design of icebreaker, drill platform, or support systems is a prototype for the next stage, and the next stage incorporates a thorough evaluation of the

technical merits and deficiencies of its predecessor. This is the approach that the industry has, in general, undertaken throughout the Arctic to date.

- (iii) Operators should have proven procedures and capacity for handling emergencies such as blow-outs in winter: It has been mentioned that providing relief to mobile drilling platforms late in the season or in winter would be difficult, if not impossible, with present icebreaking and supply support equipment. A requirement is, therefore, that no late season or winter drilling take place from such platforms until an adequate relief well capability exists, that is, until icebreakers are available to move an anchorable mobile unit to a relief well site under extreme ice conditions. It would, of course, also require that mobile units capable of drilling winter relief wells are available in the general vicinity of other such units.
- (iv) Operators should make as clear as possible their long-term requirements: DIAND has the overall planning and coordinating role with respect to northern lands and waters. Even at the exploration stage, operators undertake some planning concerned with development and production, including the planning of facilities such as shorebases, access roads, airstrips, pipeline corridors, and oil and gas processing plants. Operators should advise government agencies, especially DIAND, with respect to such plans to allow government to incorporate the industry's requirements in its own planning.

The Socio-economic Milieu

- (i) Companies should coordinate their approaches to consultation and action with respect to Beaufort communities: This guideline responds to three problems: a) different corporate styles and approaches, which confuse local people; b) potential competition among companies for limited local business and labour; and, c) the disruption that results from uncoordinated visits to communities. It should be noted, however, that company staff in liaison roles with communities are, for the most part, experienced and sensitive to community points of view.
- (ii) Companies should provide career employment opportunities: This guideline responds to earlier points about imbalance between seasonal or casual employment and career opportunities. Government

cannot permit a situation to develop that would make northerners miss the opportunity for good jobs that oil and gas development will generate in the future. It recognizes that it must play a stronger role in ensuring that people have the education and skills to play an effective role with industry and it is making resources available via the EDA process.

- (iii) Wage employment should allow native people time off to hunt, fish and trap: Several companies have used rotational programs in their operations. As well, exploration has occurred mainly in summer, leaving native employees free to engage in harvesting for much of the year. As the exploration season becomes extended, and as production becomes imminent, a standard but flexible approach to harvesting leave will be needed. Specific leave periods should be agreed to in advance by the relevant companies, community councils, and hunters and trappers associations.
- (iv) The distribution of employment and business opportunities should be fair and reasonable: Policies of northern preference should apply to both employment and business programs. It is understandable that major centres such as Inuvik and Tuktoyaktuk participate more in employment and business than other communities, but all communities should benefit. It should be noted that the major exploration companies have, in general, behaved responsibly with respect to regional purchases.
- (v) Transactions between oil and gas companies and regional businesses should enhance business expertise: There are a number of ways of doing this, including company and government sponsored seminars, joint ventures with outside firms, and the placement of local people in executive training roles. To ensure that regional firms have sufficient information on which to base their activities, oil and gas companies should publish advance notice of their requirements, making full use of the northern media and Canadian Employment and Immigration Commission offices. The companies have already compiled extensive registers of northern business.
- (vi) Companies should encourage native development corporations: A principal vehicle for native participation in oil and gas activity is the native corporation. The growth of such corporations should be encouraged via business arrangements such as joint ventures and equity participation.

- (vii) Companies should be encouraged to use regional products: Products such as char, caribou, and arts and crafts could enjoy wider use, subject to the constraints that resources should not be overused and that there should be adequate supplies for regional residents.
- (viii) Companies should be sensitive to the character of regional communities: Communities differ considerably in their readiness to take on employment or business opportunities. Companies should not encourage small communities to enter into business or employment arrangements that would be difficult for them to meet. When and where necessary, companies should be prepared to provide expert services, such as counselling, to help communities overcome problems associated with oil and gas activity. Generally, however, company personnel have effective relations with the Beaufort communities.
- (ix) Company activities should avoid areas which are important to traditional harvesting: The need for this guideline is self-evident.
- (x) Company infrastructure should provide spin-off benefits to the region: As far as possible, facilities such as topping plants, access roads and airstrips, built for corporate purposes, should also fill regional economic needs. Facilities built for regional needs could be cost-shared with companies, if they have a need for them. Construction of the water reservoir at Tuktoyaktuk is a good example of government-industry cooperation in infrastructure development.
- (xi) Companies should be required to use northern infrastructure or services wherever available: As one example of a practice that is not beneficial to the objectives of regional development, companies often use their own aircraft for purposes such as crew change and camp supply. Such traffic would be of major benefit to regional common carriers, whose use should be encouraged.

PART 7

CHALLENGES AND CHANGES

Most sources believe that some production of oil from the Beaufort region is possible by the end of this decade, and that production will increase during the following decade. The location and general nature of production-related activity may depend partly on whether the prime transportation mode is pipeline or tanker, but in either case the level of activity, and therefore the potential for impact, could represent a large increase over present levels.

Whether the growth in activity will be relatively smooth or disruptive will depend largely on the timeliness and quality of government and industry planning. Government has already taken important steps to coordinate and plan necessary research and monitoring activities as outlined in the northern hydrocarbon development strategy. It has expressed its intention to moderate impacts by applying the principle of phased development in which demonstration projects would precede full-scale development.

Another important step includes land use planning which will, as a priority, focus on the Beaufort region. The Beaufort Sea Environmental Assessment Review Panel will shortly consider the proponents' Environmental Impact Statement (EIS) and recommend terms and conditions under which production might proceed.

In its EIS, the industry suggests that it can greatly moderate its impact on the Beaufort by continuing to rotate the majority of its personnel north-south, and requiring only a small proportion to become residents of the region. Industry challenges government and the communities to determine how rapidly the population of the region should grow and indicates that it will be prepared to meet whatever strategy is agreed upon.

The future of the Beaufort Sea region suggests challenges and changes. The challenges during the next twenty years are many. The region should see a large capital investment in oil and gas exploration and production, and a large growth in Beaufort Sea labour demand, perhaps leading to the rapid growth of some of the region's communities. Large-scale transport systems (tankers and/or pipelines) will be developed to move hydrocarbons to southern markets, and more extensive shorebase facilities will be developed to support offshore activity. A shift will be seen from continuing exploration activity to a mix of exploration, development and production. A continuing

use of floating drillships is predicted for the future, but with greater emphasis on fixed exploration and production platforms.

But regardless of the promise of these challenges, DIAND is quick to reiterate that any changes likely to be incurred in the region by hydrocarbon activities will happen only in a thoughtful and systematic manner, so as to ensure that environmental and social values north of 60 remain intact.

